DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 25, 121, 125, and 135

[Docket No. 24251; Notice No. 847–17A]

RIN 2120–AA49

Fuel System Vent Fire Protection

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: This notice proposes an amendment to the airworthiness standards for transport category airplanes to require fuel system vent protection during post-crash ground fires. This proposal is the result of information obtained from public hearings on aircraft fire safety, and recommendation by the Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, and is intended to provide protection against a fuel tank explosion following a post-crash ground fire. The proposed amendment would apply to air carriers, air taxi operators, and commercial operators of transport category airplanes, as well as the manufacturers of such airplanes.

DATES: Comments must be received on or before June 2, 1995.

ADDRESSES: Comments on this proposal may be mailed in triplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket (AGC–200), Docket No. 24251, 800 Independence Avenue SW., Washington, D.C. 20591, or delivered in triplicate to: Room 915G, 800 Independence Avenue SW., Washington, D.C. Comments must be marked: Docket No. 24251. Comments may be inspected in Room 915G weekdays, except Federal holidays, between 8:30 a.m. and 5:00 p.m. In addition, the FAA is maintaining an information docket of comments in the Office of the Assistant Chief Counsel (ANM–7), Federal Aviation Administration, Northwest Mountain Region, 1601 Lind Avenue SW, Renton, Washington 98055–4056. Comments in the information docket may be inspected in the Office of the Assistant Chief Counsel weekdays, except Federal holidays, between 7:30 a.m. and 4:00 p.m.

FOR FURTHER INFORMATION CONTACT: Mike McRae, FAA, Airframe and Propulsion Branch (ANM–112), Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington 98055–4056; telephone (206) 227–2133.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in this proposed rulemaking by submitting such written data, views, or arguments as they may desire. Comments relating to the environmental, energy, or economic impact that might result from adopting the proposals contained in this notice are invited. Substantive comments should be accompanied by cost estimates. Commenters should identify the regulatory docket or notice number and submit comments, in triplicate, to the Rules Docket address specified above. All comments received on or before the closing date for comments will be considered by the Administrator before taking action on this proposed rulemaking. The proposals contained in this notice may be changed in light of comments received. All comments will be available in the Rules Docket, both before and after the closing date for comments, for examination by interested persons. A report summarizing each substantive public contact with FAA personnel concerning this rulemaking will be filed in the docket. Commenters wishing the FAA to acknowledge receipt of their comments must submit with those comments a self-addressed, stamped postcard on which the following statement is made: ''Comments to Docket No. 24251.'' The postcard will be date stamped and returned to the commenter.

Availability of NPRM

Any person may obtain a copy of this NPRM by submitting a request to the Federal Aviation Administration, Office of Public Affairs, Attention: Public Information Center, APA–230, 800 Independence Avenue SW., Washington, D.C. 20591, or by calling (202) 267–3484. Communications must identify the notice number of this NPRM. Persons interested in being placed on a mailing list for future rulemaking documents should also request a copy of Advisory Circular No. 11–2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedures.

Background

Section 25.954 (14 CFR 25.954) of the current airworthiness standards for transport category airplanes requires, in part, that any fuel system vents be designed to protect the fuel system from ignition by lightning strikes or electrostatic phenomenon. However, fuel system vents are not required to protect the fuel system from ignition during a post-crash ground fire. Improved fuel system vent fire protection is the subject of this NPRM.

To investigate the feasibility of reducing the severity or occurrence of airplane fires and explosions, the FAA held two public hearings in 1977. The first, in June, considered fire and explosion hazard reduction. The second, in November, dealt with the flammability of compartment interior materials. From the information obtained at those 1977 hearings, the FAA concluded that pending rulemaking actions on fuel tank explosion protection and flammability, toxicity, and smoke production concerning cabin materials were premature. The FAA decided to reexamine the technologies involved in reducing those hazards before going forward with any new rules.

To focus advice from the industry and the public at large for this review of available technology, the FAA formed the Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee on June 26, 1978. The committee consisted of a chairman and executive director, plus 24 representatives spanning the spectrum of international aviation interests.

The SAFER Committee's advice and recommendations to the FAA are embodied in a final report, FAA–ASF–80–4, dated June 26, 1980, Final Report of the Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee. This notice responds to the recommendation of the SAFER Committee concerning fuel system vent protection. Recommendations made in other areas are the subject of other rulemaking actions and are not relevant to this notice.

The SAFER Committee reviewed worldwide transport airplane accidents involving post-crash fuel tank explosions that had occurred since 1964 and concluded that with existing technology, the potential for post-crash explosion hazards could be reduced. The Committee considered that fuel system vent flame arrestors or surge tank explosion suppression systems used in some current airplanes to protect against lightning-induced ignition at fuel vent outlets might also be able to delay propagation of ground fires and the subsequent explosions, to provide additional time for safe evacuation of passengers. They also considered that a design practice in use on some current airplanes that provides for closure of both fuel tank-to-engine and engine fuel control shutoff valves during normal engine shutdown would also maximize the probability of engine fuel supply shutoff in post-crash fire accidents. On the basis of these

considerations, the SAFER Committee made the following regulatory recommendations to the FAA:

1. Amend 14 CFR part 25 to require fuel tank vent protection from ground fires by adding a new § 25.975(a)(7) to read: ''Each vent to atmosphere must be designed to minimize the possibility of external ground fires being propagated through the vent line to the tank vapor space, providing that the tank and vent structure remain intact.''

2. Amend part 25 to require design practices that maximize the probability of engine fuel supply shutoff in potential fire situations.

To implement the SAFER propulsion system recommendations, preliminary rulemaking action was initiated. Advance Notice of Proposed Rulemaking (ANPRM) No. 84–17 was published in the **Federal Register** (49 FR 38078, September 26, 1984) for the purpose of obtaining public comments, information, and data relative to adding new airworthiness standards applicable to transport category airplane fuel systems. The objective of the rulemaking proposed in Notice 84–17 was to develop airworthiness standards that would provide protection against fuel tank explosions following a post-crash ground fire, and that would assure engine and auxiliary power unit fuel supply shutoff to reduce the fire hazard from spilled fuel.

Comments were received from the general public, airplane manufacturers, and other interested organizations in the United States and Europe. Eight of the commenters, including the Airline Pilots Association (ALPA), Aerospace Industries Association of America (AIAA), and the Air Transport Association of America (ATA), support the proposed rule change regarding fuel system vent fire protection, whereas five commenters object to the proposal. The ATA response indicates that while comments received from their member airlines generally support the ''aircraft design enhancements'' discussed in the ANPRM, some remain unconvinced that the specific proposals will produce the desired results. They state, however, that even with minimal justification for such changes, it appears sufficiently promising to proceed with a more detailed cost-benefit analysis.

In general, commenters opposing the proposal argue that the added cost and complexity of the installed fuel system vent fire protection would exceed the very small safety benefits that might accrue from the installation. Further, they express concern that the critical vent system performance might be compromised by the installation of a flame arrestor. They believe the costs would not be commensurate with the benefits, although they submitted no facts or figures to support their contention. One commenter states that the occurrence of only two incidents in a 20-year period, only one of which would have been mitigated if the airplane had met the proposed fire protection standards, is not sufficient justification for requiring new standards. As discussed below, the FAA concludes that the projected benefits from this proposal are sufficient to warrant further action. Further, the costs and risks to vent performance are expected to be relatively small, since the majority of transport category airplanes currently incorporate flame arrestors in the fuel system vents. Many of these arrestor installations were expressly designed to provide protection from ground fires and have demonstrated the ability to safeguard vent system performance.

A preliminary regulatory evaluation was completed in November 1985. Although the analysis showed that the costs exceeded the benefits, it was noted that the analysis did not properly account for the potential magnitude of a hazardous situation created by a post-crash ground fire and a fuel tank explosion. As discussed below, to address these factors a new regulatory evaluation was completed that demonstrates that the benefits exceed the costs. Therefore, in light of the comments received in response to Notice 84–17, the SAFER Committee conclusions and recommendations, and the fact that public safety would be enhanced, the FAA finds the proposed changes to 14 CFR parts 25, 121, 125, and 135 are in the interest of public safety and should be promulgated. Nevertheless, the comments received in response to the advance notice were considered during the development of the regulatory evaluation for this notice.

While the regulatory evaluation for this notice was being prepared, Congress enacted Public Law 100–591, ''Aviation Safety Research Act of 1988.'' Section 9(a) of that Act resulted in the FAA publication of Advance Notice of Proposed Rulemaking (ANPRM) No. 89–11 (54 FR 18824, May 2, 1989). Notice 89–11 requested new information on the feasibility of installing ''crashworthy fuel systems.'' The comments received indicate that although additional information is needed, improvements in fuel system crashworthiness beyond those envisioned by the SAFER committee recommendation on fuel feed shutoff are feasible. Therefore, the fuel feed shutoff provisions of Notice 84–17 are being incorporated into the regulatory evaluation prepared for the proposed rulemaking resulting from Notice 89–11, which the FAA anticipates will more completely address the threat from fuel leakage following a survivable crashlanding.

Discussion

To minimize the possibility of propagation of external ground fires through the vent system, it would be necessary to design a flame arrestor or flame suppression device or system to prevent flame penetration and propagation through the airplane fuel tank vent system for a finite period of time. This time period should be no less than the time required for an external fire to heat fuel and vapors in a wing tank to its auto ignition temperature, or for an external fire to penetrate the undersurface of an empty wing tank, whichever is greater. Typically, this tank material is at least fire resistant; therefore, a period of protection of five (5) minutes is considered consistent with the currently accepted criteria for fire resistant materials. The FAA proposes to adopt a new § 25.975(a)(7) to require that each fuel tank be designed to prevent the propagation of flames from external fires through the fuel tank vents and any other external openings to fuel tank vapor spaces for a minimum of five minutes after a survivable crash landing when the fuel tank and the vent system remain intact.

In order to maximize the net potential benefits by increasing safety during survivable post-crash evacuations, the FAA considers it appropriate to require that the proposed changes to part 25 be incorporated in all transport category airplanes that are used in air carrier, air taxi, or commercial service under the provisions of 14 CFR parts 121, 125, or 135 as soon as practicable. Currently, about 75 percent of the fleet have a flame arrestor device that may comply with proposed § 25.975(a)(7). For airplanes manufactured after the effective date of the rule, compliance would be required within one year. For all other airplanes in operation, compliance would be required within two years. The FAA considers this timeframe to be sufficient to allow manufacturers and operators to design and install a fuel vapor flame suppression device that meets the new requirements. Parts 121, 125, and 135 would be revised accordingly.

Regulatory Evaluation

This section summarizes the full regulatory evaluation prepared by the FAA that provides more detailed estimates of the economic consequences of this proposed regulatory action. This summary and the full evaluation

quantify, to the extent practicable, estimated costs and anticipated benefits to the private sector, consumers, and Federal, State, and local governments.

Proposed changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Finally, the Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. In conducting these analyses, the FAA has determined that this rule: (1) Would generate benefits that would justify its costs and is not a ''significant regulatory action'' as defined in the Executive Order; (2) is not significant as defined in Department of Transportation Regulatory Policies and Procedures; (3) would not have a significant impact on a substantial number of small entities; and (4) would not have a negative impact on international trade. These analyses, available in the docket, as summarized below.

As discussed earlier, several commenters to the ANPRM claim that the benefits of fuel system vent protection would not outweigh the costs. The FAA disagrees with these claims. The Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee identified four accidents worldwide in which effective fuel vent fire protection could have prevented or delayed post-crash fires (Malaysian Airways Comet 4, Singapore, 1964; TWA 707, Rome, 1964; BOAC 707, London, 1968; and Seaboard World DC–8, Stockton, 1969. After sustaining relatively minor impact damage, all four airplanes were destroyed by fire and explosions, resulting in 53 fatalities and 55 serious injuries. As summarized below, the number of fuel tank fires that this proposed rule might prevent is expected to be low, but the expected value of averting a single incident would exceed the estimated compliance costs.

Costs

The FAA assumes that manufacturers and operators would use vent flame arrestors as the most effective and economical means of compliance. For a representative large transport airplane, the FAA estimates that non-recurring costs would be approximately $700 and that recurring operating costs would be approximately $51 per year. Corresponding estimates for a representative small transport airplane are approximately $400 in non-recurring costs and $51 in recurring costs.

Section 25.954 currently requires, in part, that fuel systems be designed to prevent ignition within the fuel system by lightning strikes and other electrostatic phenomena. Flame arrestors and suppressors are offered as standard or optional equipment on most U.S. transport airplanes in current production. Approximately 75 percent of the transport airplane fleet currently have devices that might meet the criteria of the proposed rule. Until actual testing and evaluation is performed, however, it cannot be determined whether these devices would qualify. For purposes of this cost analysis, therefore, all relevant airplanes are assumed to be affected.

Based on this premise, approximately 11,048 airplanes would be affected during the first ten years following the effective date of the rule. applying the unit costs summarized above to this number of airplanes yields a total cost of $18.8 million (constant dollars), or $11.5 million discounted to present value. The average annualized costs per airplane are $142 for large transport airplanes and $120 for small transport airplanes.

Benefits

Since the four accidents identified by the SAFER Advisory Committee, there have been no known accidents in which fuel vent fire protection would have prevented or delayed post-crash fires. This is attributable in part to regulatory and voluntary initiatives aimed aircraft fire safety, such as the use of less volatile fuels, and improve safety performance that reduced the opportunities for post-crash fires.

Notwithstanding the absence of fuel tank fires in recent years and lacking other sufficient bases upon which to estimate the risks of future fires, the merits of the proposed rule can be assessed by considering the number of incidents that would need to be prevented to offset the costs of the rule. For large passenger-configured transport airplanes, the prevention of one fuel tank fire during the operating lives of such airplanes affected during the first ten years of the rule would yield expected benefits of approximately $106 million, or $40.1 million discounted to present value. This estimate reflects an accident involving a representative large transport airplane with 130 occupants and 20 percent fatality and 20 percent serious injury rates. Corresponding estimates for small passenger-configured and cargo-configured transport airlines would be $15 million ($5.7 million discounted) and $16 million ($6.0 million discounted), respectively.

Summary of Costs and Benefits

The FAA finds the proposed rule to be cost beneficial because the expected benefits of preventing just one post-crash fire outweigh the expected costs ($40.1 million in benefits versus $7.3 million in costs for large passenger-configured transport airplanes; $5.7 million in benefits versus $4.2 million in costs for small passenger-configured transport airplanes; and $6.0 million in benefits versus $5.7 million in costs for cargo-configured transport airplanes). If this action is not taken, a hazard would continue to exist, even though effective and low-cost means are available to minimize or eliminate it. To the extent that existing devices might satisfy the proposed criteria, the total incremental costs would be less than those summarized above.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by government regulations. The RFA requires agencies to evaluate alternative remedies when a rule would have a ''significant economic impact on a substantial number of small entities.'' The FAA has determined that the proposed rule would not have a significant impact on a substantial number of small entities.''

Trade Impact Statement

The proposed rule would have no impact on trade opportunities for U.S. firms doing business in foreign markets and foreign firms doing business in the U.S. market.

Federalism Implications

The regulations proposed herein would not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

Because the installation of fuel system vent protection equipment is not expected to result in a substantial economic cost, the FAA has determined that this proposed regulation is not significant under Executive Order 12866. In addition, the FAA has

determined that this action is not significant as defined in Department of Transportation Regulatory Policies and Procedures (44 FR 11034, February 26 1979). Under the criteria of the Regulatory Flexibility Act, the FAA certifies that this proposed regulation, if adopted, would not have a significant economic impact, positive or negative, on a substantial number of small entities. A copy of the initial regulatory evaluation prepared for this proposal may be examined in the public docket or obtained from the person identified under the caption, **FOR FURTHER INFORMATION CONTACT**.

List of Subjects

14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

14 CFR Part 121

Air carriers, Aircraft, Airmen, Aviation safety, Charter flights, Reporting and recordkeeping requirements, Safety, Transportation.

14 CFR Part 125

Aircraft, Airmen, Aviation Safety, Reporting and recordkeeping requirements.

14 CFR Part 135

Air taxis, Aircraft, Airmen, Aircraft safety, Reporting and recordkeeping requirements.

The Proposed Amendments

Accordingly, the Federal Aviation Administration (FAA) proposes to amend 14 CFR parts 25, 121, 125, and 135 of the Federal Aviation Regulations (FAR) as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. The authority citation for part 25 continues to read as follows:

Authority: 49 U.S.C. app. 1344, 1354(a), 1355, 1421, 1423, 1424, 1425, 1428, 1429, 1430; 49 U.S.C. 106(g); and 49 CFR 1.47(a).

2. By amending § 25.975 by removing the word ''and'' at the end of paragraph (a)(5), by removing the period at the end of paragraph (a)(6) and adding ''; and'' in its place, and by adding a new paragraph (a)(7) to read as follows:

§ 25.975 Fuel tank vents and carburetor vapor vents.

(a) * * *

(7) Each fuel tank vent must be designed to prevent the propagation of flames from external ground fires through the fuel tank vents and any other external openings to fuel tank vapor spaces for a minimum of five minutes after a survivable crash landing, when the fuel tank and the vent system remain intact.

* * * * *

PART 121—CERTIFICATION AND OPERATIONS: DOMESTIC FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

3. The authority citation for part 121 continues to read as follows:

Authority: 49 U.S.C. app. 1354(a), 1355, 1356, 1357, 1401, 1421–1430, 1472, 1485, and 1502; 49 U.S.C. 106(g).

4. By revising § 121.316 to read as follows:

§ 121.316 Fuel systems.

(a) No person may operate a turbine-powered transport category airplane after October 30, 1991, unless it meets the fuel tank access cover criteria of § 25.963(e) of this chapter in effect on October 30, 1989.

(b) After [a date 1 year after the effective date of the amendment], no person may operate a transport category airplane manufactured on or after that date unless it is equipped with a fuel vapor flame suppression device that meets the requirements of § 25.975(a)(7) of this chapter.

(c) After [a date 2 years after the effective date of the amendment], no person may operate any other transport category airplane unless it is equipped with a fuel vapor flame suppression device that meets the requirements of § 25.975(a)(7) of this chapter.

PART 125—CERTIFICATION AND OPERATIONS: AIRPLANES HAVING A SEATING CAPACITY OF 20 OR MORE PASSENGERS OR A MAXIMUM PAYLOAD CAPACITY OF 6,000 POUNDS OR MORE

5. The authority citation for part 125 continues to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1430, and 1502; 49 U.S.C. 106(g), (Revised Pub. L. 97–449, January 12, 1983).

6. By adding a new § 125.214 to read as follows:

§ 125.214 Fuel systems.

(a) After [a date 1 year after the effective date of the amendment], no person may operate a transport category airplane manufactured on or after that date unless it is equipped with a fuel vapor flame suppression device that meets the requirements of § 25.975(a)(7) of this chapter.

(b) After [a date 2 years after the effective date of the amendment], no person may operate any other transport category airplane unless it is equipped with a fuel vapor flame suppression device that meets the requirements of § 25.975(a)(7) of this chapter.

PART 135—AIR TAXI OPERATORS AND COMMERCIAL OPERATORS

7. The authority citation for part 135 continues to read as follows:

Authority: 49 U.S.C. app. 1354(a), 1355(a), 1421 through 1431, and 1502; 49 U.S.C. 106(g); and 49 CFR 1.47(a).

8. By adding a new § 135.187 to subpart C to read as follows:

§ 135.187 Fuel systems.

(a) After [a date 1 year after the effective date of the amendment], no person may operate a transport category airplane manufactured on or after that date unless it is equipped with a fuel vapor flame suppression device that meets the requirements of § 25.975(a)(7) of this chapter.

(b) After [a date 2 years after the effective date of the amendment], no person may operate any other transport category airplane unless it is equipped with a fuel vapor flame suppression device that meets the requirements of § 25.975(a)(7) of this chapter.

Issued in Washington, D.C., on January 20, 1995.

Elizabeth Yoest,

Acting Director, Aircraft Certification Service.

[FR Doc. 95–2115 Filed 2–1–95; 8:45 am]

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